



Processing fissile materials and cleaning contaminated parts are hazardous jobs. Workers must face the potential not only for injuries associated with equipment and processing operations but also for radioactive contamination and exposure. These safety issues weighed heavily on the designers working on the ARIES project.

ARIES consists of eight integrated modules that process plutonium and uranium. To maximize safety when executing these processes, designers focused on automation. Automated systems use mechanization or robots to perform functions that previously required human participation.

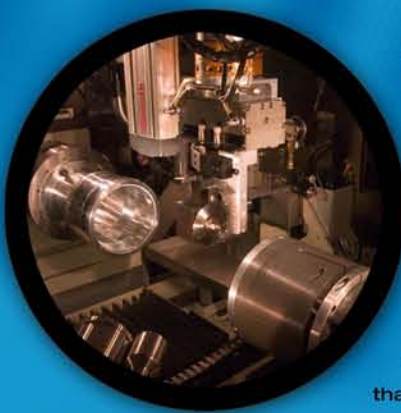
AN OVERHEAD GANTRY ROBOT MOVES A CONTAINER OF PLUTONIUM OXIDE INTO A STORAGE ARRAY (BELOW LEFT) AND FROM THERE TO THE NEUTRON COINCIDENCE COUNTER (BELOW RIGHT) IN THE NONDESTRUCTIVE ASSAY SUITE. WORKING IN CONCERT WITH A CENTRAL COMPUTER, THE ROBOT MINIMIZES WORKER EXPOSURE TO RADIOACTIVE MATERIALS BY ENABLING AUTOMATED MEASUREMENTS USED FOR MATERIALS CONTROL AND ACCOUNTABILITY.



ARIES

ADVANCED RECOVERY & INTEGRATED EXTRACTION SYSTEM

AUTOMATION ENHANCING WORKER SAFETY



The ARIES project serves as a test bed for the development and testing of equipment for the Department of Energy's Pit Disassembly and Conversion Facility (PDCF). Having put the ARIES modules through rigorous testing, designers are now using ARIES prototypes to engineer industrial equipment that eventually will make up the PDCF.

THE ARIES LATHE ROBOT (FAR LEFT) PLACES FIXTURES ONTO AN AUTOMATED LATHE AND MOUNTS A BISECTOR WHEEL THAT CONDUCTS CHIPLESS CUTTING. VARIOUS GRIPPERS ENABLE THE ROBOT TO HANDLE NUCLEAR WEAPONS PITS, PRODUCT OXIDE CONTAINERS, HEMISHELLS, AND CHUCKS.

Located at the Savannah River Site, the proposed PDCF will extract, oxidize, and nondestructively assay plutonium; decontaminate and convert highly enriched uranium; and sanitize parts not classified as special nuclear material. The facility will convert surplus plutonium into a form used to produce MOX (mixed oxide) fuel for existing commercial reactors throughout the United States.

The United States will use PDCF to meet a government-to-government agreement with Russia to reduce stockpiles of weapons-grade plutonium by converting the plutonium into a proliferation-resistant form. This effort will therefore play a crucial role in reducing the global nuclear danger.

A FIVE-DEGREE-OF-FREEDOM ROBOT REMOVES AN OXIDE CONVENIENCE CAN FROM AN AIRLOCK AND PLACES A LID ON A CONTAINER BEFORE WELDING.



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